

nected to the computer system **650** through wired connections (e.g., cables/ports). In other cases, the I/O devices **680** may be connected to the computer system **650** through wireless connections. By way of example, the data link may correspond to PS/2, USB, IR, RF, Bluetooth or the like.

[0089] In accordance with one embodiment of the present invention, the memory block **658** includes an expansion program **688** for controlling the expansion of the touchscreen display **668/670**, particularly both the image and input level of the touchscreen display. By way of example, the expansion methodology shown and described in the previous figures may be utilized by the expansion program. In one embodiment, the expansion program is integrated with or part of the operating system. The expansion therefore can be implemented in any of the displayed pages operating under the control of the operating system (e.g., system pages, webpages, application pages, etc.). Alternatively, the expansion program may be part of a separate application.

[0090] The expansion program **688** may include an expansion database that stores the expansion characteristics. The expansion characteristics generally refer to how the system is to be expanded, i.e., the expansion program refers to the expansion characteristics when implementing expansion. The expansion characteristics may include for example magnification levels, the size and shape of the expanded area, the slope of the transition area, rate of expansion, the latency time before the expanded area returns to normal state, the dwell time before the expansion is implemented, touch pressure, tapping speed, hovering time, etc. The expansion characteristics stored in the database may be accessed by a user through an expansion control menu, which may be viewed on a display screen as part of the GUI. The expansion control menu may include expansion control settings pertaining to the expansion characteristics. In fact, the expansion control menu may serve as a control panel for reviewing and/or customizing the expansion control settings, i.e., the user may quickly and conveniently review the expansion control settings and make changes thereto. Once the user saves the changes, the modified expansion control settings will be employed to handle future expansion. Furthermore, it may be possible for the user to disable the expansion feature so that the system can revert to a more conventional one.

[0091] **FIG. 15** is a flow diagram of expansion processing **650**, in accordance with one embodiment of the invention. Expansion processing **650** may be performed via a computing device such as the one described in **FIG. 14** in order to provide a touch screen display with an expansion effect. Expansion processing **650** generally begins at block **652** where touch data is received. The touch data may for example be received from a touchscreen. After block **652**, the process proceeds to block **654** where expansion characteristics are obtained. The expansion characteristics may for example be stored in a database of the computing device. Expansion characteristics generally refer to when and how an expansion effect is implemented. The expansion characteristics may for example include whether or not the expansion feature is activated, the touch configuration needed to initiate expansion (e.g., duration), the location, size, magnification level and shape of the expansion, the slope of the transition, the rate of expansion, whether the expansion follows motion, and the like. The expansion characteristics

may also identify a type and nature of expansion that is to be provided for a specific touch data. For example, at this touch pressure, the expansion effect follows this rate of expansion. After block **654**, the process proceeds to block **656** where expansion is initiated based on the touch data and the expansion characteristics. By way of example, the display may be instructed to visually expand a targeted area while keeping the other areas unexpanded, and further to scale the input sensitivity with the visual expansion. The manner in which this happens depends on the touch data (location, duration, pressure, etc.) and the expansion characteristics that are selected at the time of expansion processing.

[0092] The various aspects of the expansion processing described above can be used alone or in various combinations. The expansion processing is preferably implemented by a combination of hardware and software, but can also be implemented in hardware or software. The expansion processing can also be embodied as computer readable code on a computer readable medium. The computer readable medium is any data storage device that can store data, which can thereafter be read by a computer system.

[0093] While this invention has been described in terms of several preferred embodiments, there are alterations, permutations, and equivalents, which fall within the scope of this invention. For example, although the invention is primarily directed at touch screens, other sensing devices that do not require touches may be used. By way of example, sensors that can detect the proximity of an object to a surface even when the object is not in contact with the surface may be used (e.g., proximity sensors). It should also be noted that there are many alternative ways of implementing the methods and apparatuses of the present invention. It is therefore intended that the following appended claims be interpreted as including all such alterations, permutations, and equivalents as fall within the true spirit and scope of the present invention.

What is claimed is:

1. A computer implemented method for a touchscreen display, comprising:

presenting graphical information on the touchscreen display;

detecting a touch over the touchscreen display;

expanding an area of the touch screen display proximate the location of the touch.

2. The method as recited in claim 1 wherein the step of expanding includes visually expanding a localized portion of the presented graphical information in the region of the touch relative to the remaining portions of the presented graphical information outside the region of the touch.

3. The method as recited in claim 2 wherein the expanded portion of the presented graphical information is magnified between about 1× and about 4× the non expanded portion of the presented graphical information.

4. The method as recited in claim 2 wherein the expanded portion of the graphical information is raised relative to the non expanded portion of the graphical information.

5. The method as recited in claim 4 wherein the expanded portion of the graphical information includes a substantially planar plateau region and a substantially sloped transition